

WHAT IS CLAIMED IS:

1. A method for creating a micropolarizer, comprising:

providing a first plate having a first and a second surface;

providing a second plate having a first and a second surface;

coating a polyimide on each of said first surface of said two plates;

5 rubbing said polyimide coated upon said first surface of said first plate along a predetermined direction;

rubbing said polyimide coated upon said first surface of said second plate along a direction having a predetermined angle in relation to said predetermined direction;

10 aligning said first plate and said second plate having said first surface of said first plate and said first surface of said second plate facing each other thereby creating a space there between; and

filling a liquid crystal between said space whereby a cell, or film is created.

2. The method of claim 1, further comprising:

15 using a mask having alternate transparent and opaque stripes coving said cell or film whereby a solidifying energy are being selectively applied there through; and partially solidifying some portions said liquid crystal.

3. The method of claim 2, further comprising:

removing said mask; and

20 heating said cell or film to a temperature set point, whereby unsolidified liquid crystals covered by said opaque stripes are being transformed into a different phase.

4. The method of claim 1, further comprising:

re-solidifying uncured nematics into an isotropic phase.

5. The method of claim 1, further comprising:

25 substantially solidifying the materials between said first surface of said first plate and the said first surface of said second plate; and removing said first plate; and

removing said second plate.

6. The method of claim 2, wherein:
said solidifying comprises applying an ultraviolet light.

7. The method of claim 1, wherein:
5 said space having a substantially equidistance between said first surface of said first plate and said first surface of said second plate.

8. The method of claim 1, wherein:
said liquid crystal comprises a nematic liquid crystal.

9. The method of claim 8, wherein:
10 said nematic liquid crystal comprises a type of polymerizable nematic liquid crystal.

10. The method of claim 1, wherein: said predetermined angle is about ninety degrees.

11. The method of claim 1, wherein: said predetermined angle is about
15 forty-five degrees.

12. The method of claim 1, wherein:
said two plates comprising flat glass plates.

13. A method for creating a micropolarizer, comprising:
providing a first plate having a first and a second surface, said first surface
20 having an alternatively striped coatings of ITO of a predetermined strip width;
providing a second plate having a first and a second surface, said first surface
having coatings of ITO;

coating a polyimide on each of said first surface of said two plates;

25 rubbing said polyimide coated upon said first surface of said first plate along a predetermined direction;

rubbing said polyimide coated upon said first surface of said second plate
along a direction having a predetermined angle in relation to said predetermined
direction;

aligning said first plate and said second plate having said first surface of said first plate and said first surface of said second plate facing each other thereby creating a space there between; and

filling a liquid crystal between said space whereby a cell, or film is created.

5 14. The method of claim 13, further comprising:

using a mask having alternate transparent and opaque stripes coving said cell or film whereby a solidifying energy are being selectively applied there through; and partially solidifying some portions said liquid crystal.

10 15. The method of claim 14, further comprising:

removing said mask; and

heating said cell or film to a temperature set point, whereby unsolidified liquid crystals covered by said opaque stripes are being transformed into a different phase.

16. The method of claim 14, further comprising:

re-solidifying uncured nematics into an isotropic phase.

15 17. The method of claim 13, further comprising:

substantially solidifying the materials between said first surface of said first plate and the said first surface of said second plate;

removing said first plate; and

removing said second plate.

20 18. The method of claim 13, wherein:

said solidifying comprises applying an ultraviolet light.

19. The method of claim 13, wherein:

said space having a substantially equidistance between said first surface of said first plate and said first surface of said second plate.

25 20. The method of claim 13, wherein:

said liquid crystal comprising a nematic liquid crystal.

21. The method of claim 20, wherein:

said nematic liquid crystal comprising a type of polymerizable nematic liquid crystal.

22. The method of claim 13, wherein: said predetermined angle is about ninety degrees.

5 23. The method of claim 13, wherein:

said two plates comprising flat glass plates.

24. A method for creating a micropolarizer, comprising:

providing a first plate having a first and a second surface;

coating a polyimide on said first surface of said first plate;

10 rubbing said polyimide coated upon said first surface of said first plate along a predetermined direction;

coating a photo resist on top of said polyimide;

patterning said photo resist into a predetermined alternatively spaced strips;

15 re-rubbing said polyimide coated upon said first surface of said first plate along a direction having a predetermined angle in relation to said predetermined direction; and

rinsing off said photo resist.

25 25. The method of claim 24, further comprising:

providing a second plate having a first and a second surface;

20 coating a polyimide on said first surface of said first plate;

rubbing said polyimide coated upon said first surface of said first plate along a predetermined direction;

25 aligning said first plate and said second plate having said first surface of said first plate and said first surface of said second plate facing each other thereby creating a space there between; and

filling a liquid crystal between said space whereby a cell, or film is created.

26 The method of claim 24, further comprising:

solidifying said liquid crystal.

26. The method of claim 25, further comprising:
substantially solidifying the materials between said first surface of said first
plate and the said first surface of said second plate; and

removing said first plate; and

removing said second plate.

27. The method of claim 26, wherein:

said solidifying comprises applying an ultraviolet light.

28. The method of claim 24, further comprising:

re-solidifying uncured nematics into an isotropic phase.

29. The method of claim 28, wherein:

said solidifying comprises applying an ultraviolet light.

30. The method of claim 25, wherein:

said space having a substantially equidistance between said first surface of said
first plate and said first surface of said second plate.

31. The method of claim 24, wherein:

said liquid crystal comprising a nematic liquid crystal.

32. The method of claim 31, wherein:

said nematic liquid crystal comprising a type of polymerizable nematic liquid
crystal.

33. The method of claim 25, wherein: said predetermined angle is about
ninety degrees.

34. The method of claim 25, wherein:

said two plates comprising flat glass plates.

35. A method for creating a micropolarizer, comprising:

providing a first plate having a first and a second surface;

providing a second plate having a first and a second surface;

coating a coat able material on each of said first surface of said two plates;

exposing both plates to a first linearly polarized ultraviolet light;

partially covering said first plate;

re-exposing said first plate to a second polarized ultraviolet light;

aligning said first plate and said second plate having said first surface of said first plate and said first surface of said second plate facing each other thereby creating a space there between; and

filling a liquid crystal between said space whereby a cell, or film is created.

36. The method of 35, wherein:

said second polarized ultraviolet light having a polarization direction substantially perpendicular to the polarization direction of said first linearly polarized ultraviolet light

37. The method of claim 35, wherein:

said coat able material consists of polyvinyl 4-methoxycinnamate (PVMC), polyvinylcinnamates (PVC), polyimides, dyed polyimide, and azobenzene polymer.

38. The method of claim 35, wherein:

said space having a substantially equidistance between said first surface of said first plate and said first surface of said second plate.

39. The method of claim 35, wherein:

said liquid crystal comprising a nematic liquid crystal.

40. The method of claim 39, wherein:

said nematic liquid crystal comprising a type of polymerizable nematic liquid crystal.

41. The method of claim 35, wherein:

said liquid crystal is mixed with a small amount of photoresist PVMC or azo dye.

42. A method for creating a micropolarizer, comprising:

providing a first plate having a first and a second surface;

providing a second plate having a first and a second surface;

coating a coat able material on each of said first surface of said two plates;

exposing said first plate to a first linearly polarized ultraviolet light;
placing a mask over said second plate;
exposing said second plate to said first linearly polarized ultraviolet light;
partially covering said first plate;
5 translationally moving said mask a predetermined distance;
re-exposing said first plate to a second polarized ultraviolet light;
aligning said first plate and said second plate having said first surface of said
first plate and said first surface of said second plate facing each other thereby creating
a space there between; and

10 filling a liquid crystal between said space whereby a cell, or film is created.

43. The method of claim 42, wherein:

said second polarized ultraviolet light having a polarization direction
substantially perpendicular to the polarization direction of said first linearly polarized
ultraviolet light

15 44. The method of claim 42, wherein:

said coat able material consists of polyvinyl 4-methoxycinnamate (PVMC),
polyvinylcinnamates (PVC), polyimides, dyed polyimide, and azobenzene polymer.

45. The method of claim 42, wherein:

20 said space having a substantially equidistance between said first surface of said
first plate and said first surface of said second plate.

46. The method of claim 42, wherein:

said liquid crystal comprising a nematic liquid crystal.

47. The method of claim 46, wherein:

25 said nematic liquid crystal comprising a type of polymerizable nematic liquid
crystal.

48. The method of claim 42, wherein:

said two plates comprising flat glass plates.

49. The method of claim 42, wherein: said liquid crystal is mixed with a small amount of photoresist PVMC or azo dye.

50. A liquid crystal display device, comprising:
an input surface for receiving incident light;
5 an output surface for emanating a processed light; and
a micropolarizer based on twist nematic liquid crystals produced by a method comprising a liquid crystal display device produced by the method described substantially by claims 1-11.

51. A twisted nematic micropolarizer, comprising:
a first plate having a first and a second surface;
a second plate having a first and a second surface;
material coated on each of said first surface of said two plates;
a space there between said first plate and said second plate having said first surface of said first plate and said first surface of said second plate facing each other ;
15 and

a liquid crystal filling said space whereby a cell, or film is created.

51. The device of claim 51, wherein:
said coating material comprises polyvinyl 4-methoxycinnamate (PVMC), polyvinylcinnamates (PVC), polyimides, dyed polyimide, and azobenzene polymer.

20 52. The device of claim 51, wherein:
said space has a substantially equidistance between said first surface of said first plate and said first surface of said second plate.

53. The device of claim 51, wherein:
said liquid crystal comprises a nematic liquid crystal.

25 54. The device of claim 51, wherein:
said nematic liquid crystal comprises a type of polymerizable nematic liquid crystal.

55. The device of claim 51, wherein:

said two plates comprise flat glass plates.

56. The device of claim 51, wherein: said liquid crystal is mixed with a small amount of photoresist PVMC or azo dye.

57. The device of claim 51 wherein said TN-micropol is horizontally aligned.

58. The device of claim 51 wherein said TN-micropol is vertically aligned.

59. The device of claim wherein said TN-micropol is aligned vertically and horizontally in a checkerboard pattern.